REMARKS

Claims 15 and 17-26 are active in the case. Reconsideration is respectfully requested.

The present invention relates to an abrasive sheet that is used in the texturing of the surfaces of magnetic recording media.

Invention

The present invention is directed to a method of producing a magnetic recording medium by texturizing a surface of a magnetic recording medium by abrasively contacting the surface with an entangled ultrafine fiber nonwoven fabric made of three-dimensionally entangled fiber bundles composed of ultrafine fibers (A) having a fineness of no more than 0.1 dtex and a high-molecular weight elastomer having a wet elastic modulus of 0.05 to 0.95 kg/mm^2 in a porous state in spaces among the entangled ultrafine fibers (A), without substantially confining most of the ultrafine fiber bundles and a nap consisting of ultrafine fibers (B) having a fineness of not more than 0.03 dtex on at least one side of the sheet, with the proviso that in the cross-section of the sheet to a depth of about 1/3 in the thickness direction from the napped surface of the sheet, the ultrafine fibers (A) constituting the portions of the sheet other than the napped portions have a fineness of not more than 0.1 dtex.

Prior Art Rejection

Claims 15 and 17-26 stand rejected based on 35 USC 103 as obvious over Owaki, U. S. Patent 5,226,955 in view of Ashida et al, U. S. Patent 5,503,899. This ground of rejection is respectfully traversed.

At the outset of the discussion of the prior art, it is important to emphasize that applicants' claimed invention is directed to a method of producing a magnetic recording medium by texturizing a surface of the medium by abrasive contact with an entangled ultrafine fiber nonwoven fabric as defined in the present claims. Applicants do not claim the fabric per se. Although indeed the Owaki patent describes a polishing composition for hard memory discs and further simply states in column 3 that a suitable polishing machine may employ a polishing pad made from a suede-type material. No specifics are given whatsoever in the patent of a particularly suitable suede polishing pad. On the other hand, although Ashida et al discloses a particular artificial suede-like material, it does not disclose any use for the material other than as a leather substitute and is used in the manufacture of such articles as clothing, pouches, gloves and the like. In fact, the objective of the reference is to produce such a suede material that has improved pilling resistance, good color developing properties and good appearance. Importantly, there is no teaching whatever of the use of the suede material of the reference as a polishing pad for any purpose, let alone the polishing of hard memory discs. Moreover, as will be shown below, the suede material of Ashida et al is not that of the present invention. Accordingly, it is clear that the teachings of the combined references do not lead the skilled artisan to the presently claimed method without a disclosure in Ashida et al that the suede material can be used as a polishing fabric. In fact, it is clear that in order to assert that the present invention is made obvious by the cited prior art, the teachings of the present invention improperly have been used to assert that the suede material of Ashida et al can be used as the suede polishing pad in the method of Owaki.

The Examiner, in his discussion on page 5, lines 13-14 asserts that the ultrafine fibers

(A) and (B) of Ashida et al can have the same fineness. This is incorrect. As is clear from Fig 1 that is attached to the present response, the fibers (A) of the nap of the fabric of the patent never have the fineness which is the same as the fineness of fibers (B). Further, this difference in fiber fineness is also clear from the disclosure of the sought after properties of a suede-like material of having excellent color development properties and good pilling resistance (col 2, lines 28-32). These improvements are based on the fact that fibers (A) and (B) have different fineness.

Still further regarding the fineness factor, note that in column 4, lines 13-14 patentees state that fibers (B) must entangle with fine fibers (A) in order to prevent pilling in the product fabric. This desired effect can not be obtained if the two fibers have the same fineness (see Comp Ex 1 of the patent).

As indicated above, applicants also assert that the present suede material is not the same as that of Ashida et al. As is clear from Claim 15 and the discussion of the specification on page 8, the nap of the fabric consists of ultrafine fibers (B). On the other hand, in Ashida et al, both fibers (A) and (B) must participate in forming the nap in order to prevent pilling (the pulling of fibers from the suede material in the form of fluff balls) of the fabric as described at column 1, lines 29-31 of the patent. Accordingly, even if the suede material of Ashida et al is substituted for the suede polishing pad of Owaki, the polishing effect of this invention is not achieved. This is clear from Fig 2 that is attached to the response and Comp Exs 1 and 2 which are equivalent to Ashida et al's Exs 1 and 2, and the data obtained for the Comp Exs in the attached table which contrasts data from Examples and Comp Exs of the present invention with Ashida's Exs 1 and 2. It is clear that Ashida et al does not show or suggest applicants' suede material and that

the suede material of Ashida et al, when used as a polishing fabric, does not achieve the polishing results of the present invention. The present invention is therefore neither taught or suggested by the combined references. Withdrawal of the rejection is respectfully requested.

It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited

Respectfully submitted,

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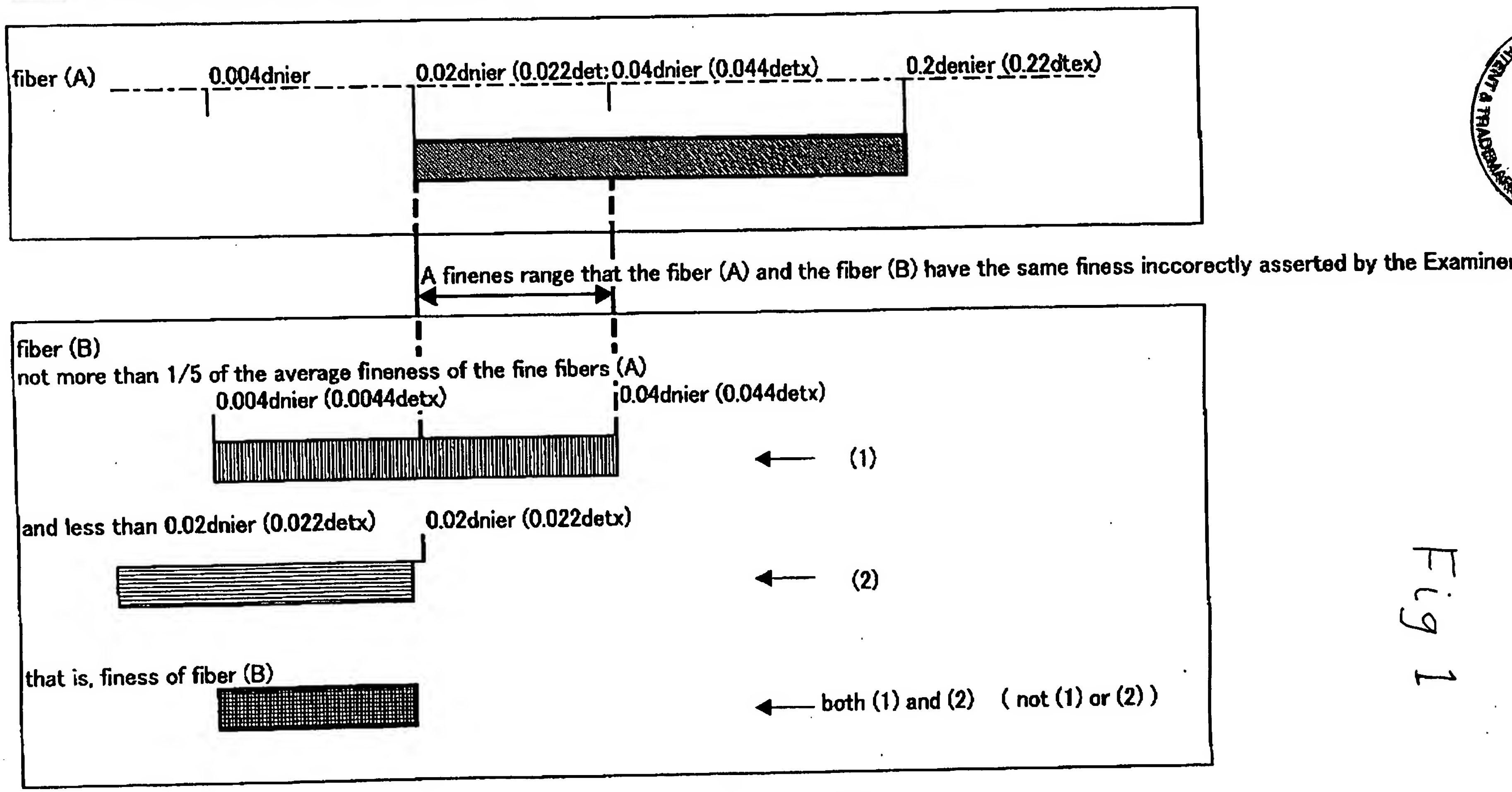
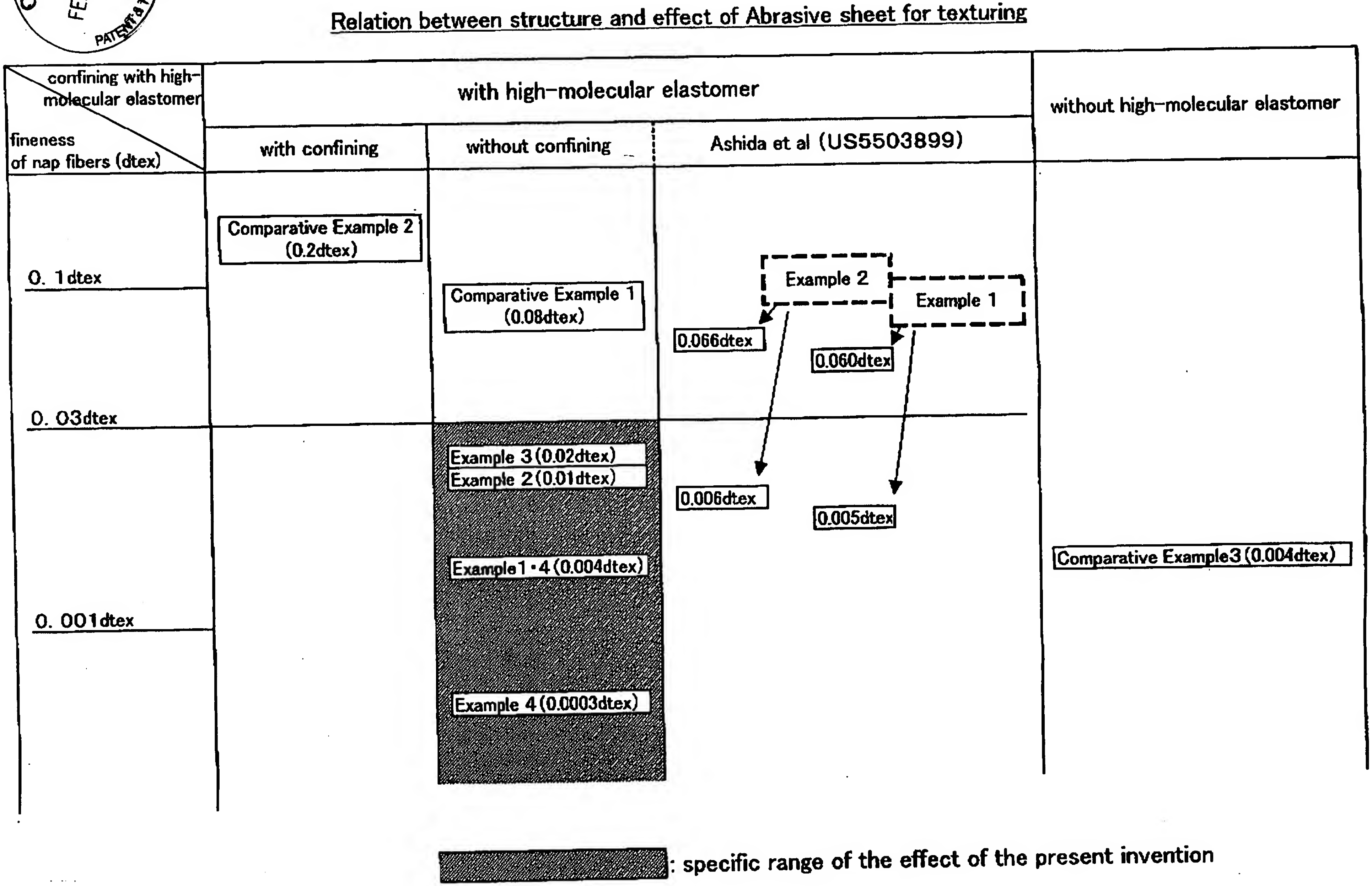
the fiber (A) and the fiber (B) of Ashida et al



Therefor the fiber(A) and fiber(B) that constitute the nap can not have the same finess.
A assertion that the fiber(A) and fiber(B) have the same finess by the Examiner is incorrect.

Fig 1

Fig 2


Relation between structure and effect of Abrasive sheet for texturing
confining with high-molecular elastomer
fineness of nap fibers (dtex)
with high-molecular elastomer
without high-molecular elastomer
with confining
without confining
Ashida et al (US5503899)
0. 1dtex
0. 03dtex
0. 001dtex
Comparative Example 2 (0.2dtex)
Comparative Example 1 (0.08dtex)
Example 2
Example 1
0.066dtex
0.060dtex
0.006dtex
0.005dtex
Example 3 (0.02dtex)
Example 2 (0.01dtex)
Example1・4 (0.004dtex)
Example 4 (0.0003dtex)
Comparative Example3 (0.004dtex)
: specific range of the effect of the present invention

Hereafter, as a supplementation, we present Complement Examples so that the Examiner understand claim 15 have the special effect for Ashida et al.

Complement Example 1 (Equivalent of Ashida's Example 1)

60% by weight of nylon 6 (Ny6) was used as the island component (for fiber (A)), and both 5% by weight of Ny6(for fiber (B)) and 35% by weight of low-density polyethylene (LDPE) was used as the sea component. They were melt-spun by the so-called conjugate spinning method. And composite fiber(c) is obtained. The spinning conditions were so controlled that the number of fine fibers (A) present in the fiber (C) was 50. When cross-sections of said fibers (C) were observed, the average number of microfine fibers (B) per a strand of the fiber (C) was found to be about 50.

An abrasive sheet for texturing with a thickness of 0.54 mm and an apparent specific gravity of 0.37 g/cm^3 was obtained in the same manner as in Example 2 except that the above the fiber (c) were used.

In this abrasive sheet, the fiber (a) had a fineness of 0.06 dtex, the fiber (b) had a fineness of 0.005 dtex and the weight proportion of the high-molecular elastomer was 38%. Most of the fiber bundles were in a state free from confinement by the high-molecular elastomer.

Using the napped sheet obtained as an abrasive sheet, texturing was carried out in the same manner as in Example 1 and then three disk substrates sampled at random were evaluated for Ra. The every Ra values were exceeding 1.0 nm and therefore it could not be said that the order of not more than 1.0 nm was stably attained. The abrasive sheet was evaluated for surface condition and it was found that a large amount of abrasion dust was adhering.

Complement Example 2 (Equivalent of Ashida's Example 2)

60% by weight of polyethylene terephthalate (PET) was used as the island component (for fiber (A)), and both 5% by weight of PET(for fiber (B)) and 35% by weight of low-density polyethylene (LDPE) was used as the sea component. They were melt-spun by the so-called conjugate spinning method. And

composite fiber(c) is obtained. The spinning conditions were so controlled that the number of fine fibers (A) present in the fiber (C) was 50. When cross-sections of said fibers (C) were observed, the average number of microfine fibers (B) per a strand of the fiber (C) was found to be about 50.

An abrasive sheet for texturing with a thickness of 0.56 mm and an apparent specific gravity of 0.41 g/cm^3 was obtained in the same manner as in Example 2 except that the above the fiber (c) were used.

In this abrasive sheet, the fiber (a) had a fineness of 0.066 dtex, the fiber (b) had a fineness of 0.006 dtex and the weight proportion of the high-molecular elastomer was 25%. Most of the fiber bundles were in a state free from confinement by the high-molecular elastomer.

Using the napped sheet obtained as an abrasive sheet, texturing was carried out in the same manner as in Example 1 and then three disk substrates sampled at random were evaluated for Ra. The every Ra values were exceeding 1.0 nm and therefore it could not be said that the order of not more than 1.0 nm was stably attained. The abrasive sheet was evaluated for surface condition and it was found that a large amount of abrasion dust was adhering.

Example, Comparative Example and Complement Example List

	Example 1	Example 2	Example 3	Example 4	Comparative Example 1	Comparative Example 2	Comparative Example 3
Fineness [dtex]	0.004	0.01	0.02	0.0003 / 0.004	0.08	0.2	0.004
Wet elastic modulus [kg/mm^2]	0.42	0.23	0.42	0.23	0.23	0.42	—
Thickness [mm]	0.55	1.18	0.37	0.79	0.68	0.47	0.56
Apparent specific gravity [g/cm^3]	0.34	0.39	0.51	0.38	0.46	0.41	0.45
High-molecular elastomer proportion [%]	36	45	24	34	50	21	0
Mean surface roughness Ra [nm] (n=3)	0.4/0.4/0.5	0.6/0.6/0.7	0.7/0.7/0.8	0.4/0.5/0.5	0.9/1.0/1.2	1.7/1.8/1.8	0.7/0.8/1.4
Abrasive tape surface condition	○	○	◎	○	○	×	×
Abrasive tape comprehensive evaluation	○	○	○	○	×	×	×

	Equivalent of Ashida's Example 1	Equivalent of Ashida's Example 2
Fineness [dtex]	0.005(0.0045dr) +0.060(0.054dr)	0.006(0.005dr) +0.066(0.060dr)
Wet elastic modulus [kg/mm^2]	0.23	0.23
Thickness [mm]	0.54	0.56
Apparent specific gravity [g/cm^3]	0.37	0.41
High-molecular elastomer proportion [%]	38	25
Mean surface roughness Ra [nm] (n=3)	>1.0	>1.0
Abrasive tape surface condition	×	×
Abrasive tape comprehensive evaluation	×	×